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(71) Applicant(s)
Superpitch Limited

(Incorporated in the United Kingdom)

Conduit Industrial Estate, Conduit Road, Norton Canes, CANNOCK, Staffs, WS11 3TJ, United Kingdom

(72) Inventor(s)
Emlyn Robert Miller

(74) Agent and/or Address for Service
Audrey Knowles & Co
624 Pershore Road, Selly Park, BIRMINGHAM, B29 7HG, United Kingdom

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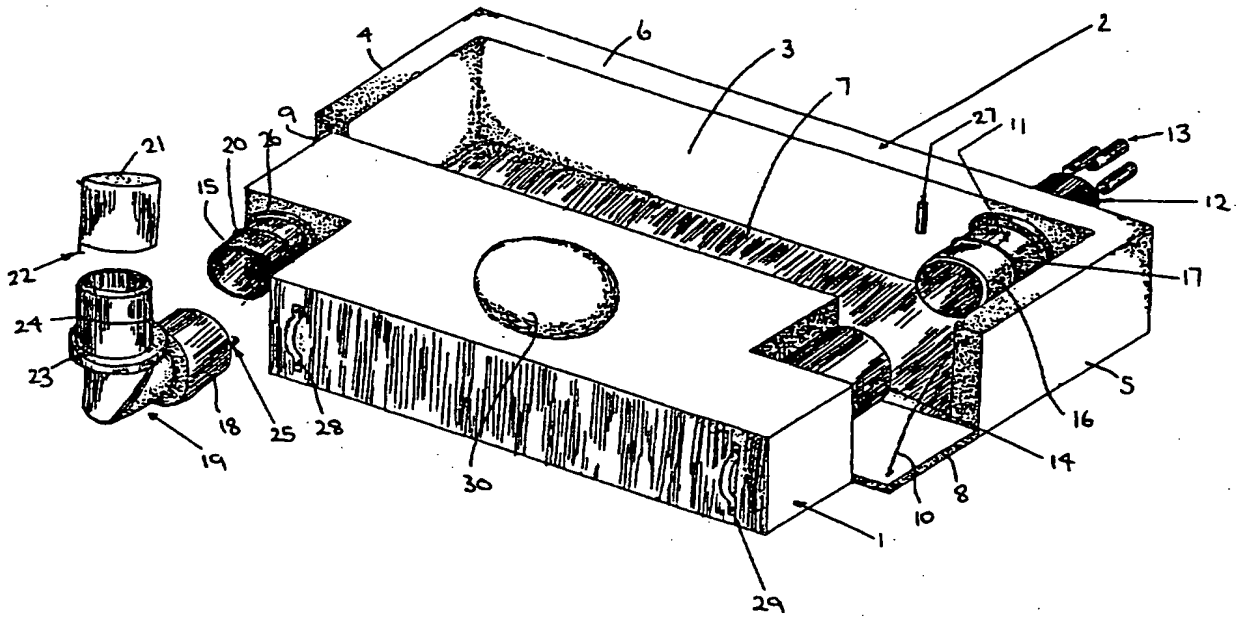
(54) Waste water collection and storage system for vehicles

(57) Apparatus for the disposal of waste water from touring caravans, camper vans and like vehicles comprises a tank 1 for detachable mounting on the vehicle to connect releasably an inlet 14 to an inlet adaptor 11 for one or more sources 13 of waste water. The tank 1 can be periodically demounted and drained by opening an outlet 15. Alternatively, the tank 1 can be continuously drained in situ by connecting the outlet 15 to a sewer.



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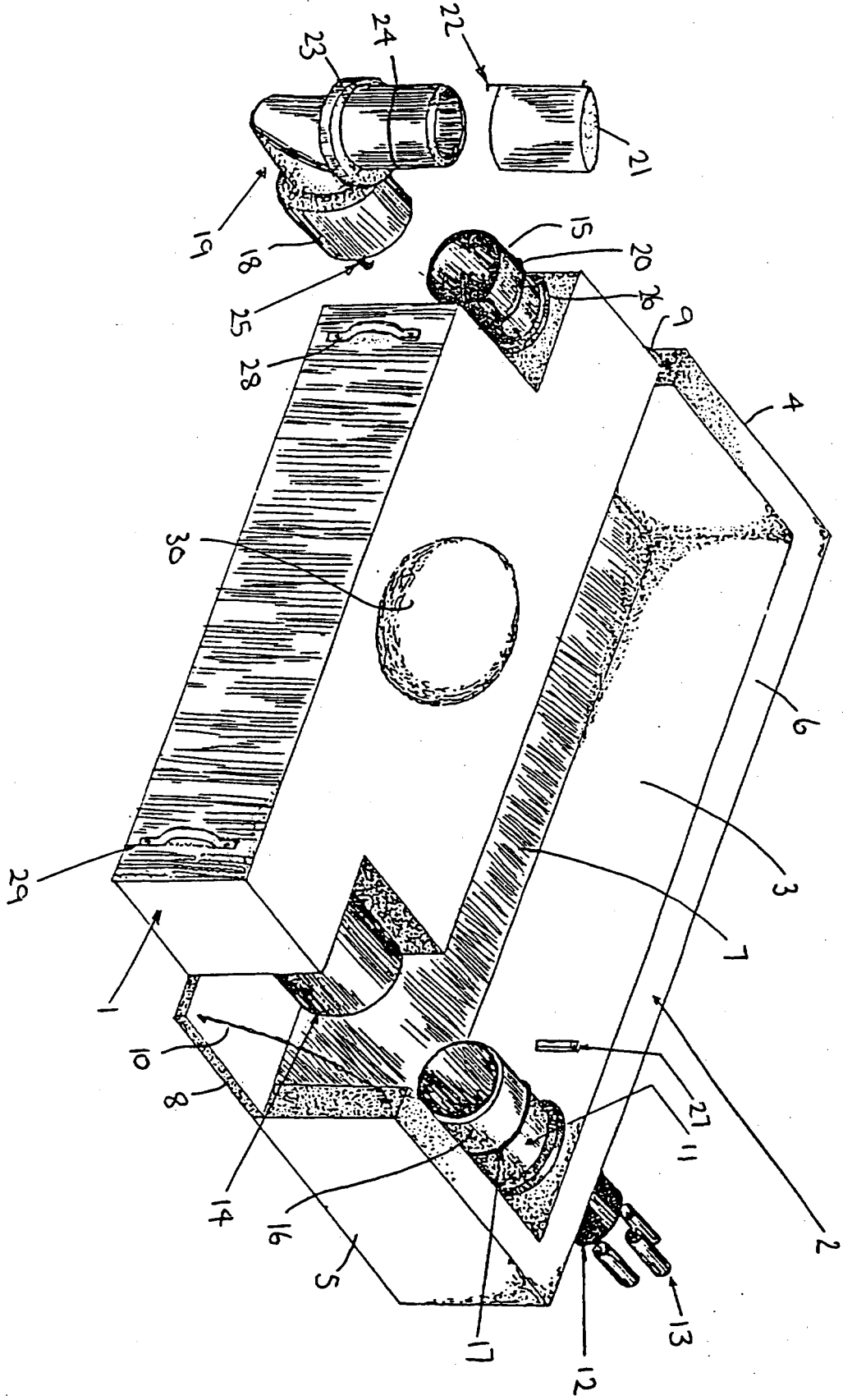
At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1995



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WASTE WATER COLLECTION AND STORAGE SYSTEM

This invention relates to apparatus for collecting and storing waste water and in particular, though not exclusively, to the use of such apparatus in touring caravans, camper vans and like vehicles.

A waste water collection and storage system for touring caravans, camper vans and like vehicles typically comprises a portable container that is sited outside the vehicle when stationary with appropriate connections for draining waste water from sinks, washbasins, showers and toilets into the container.

A disadvantage of this system is that it can be only be used when the vehicle is stationary and has to be disconnected for storage of the container inside the vehicle when the vehicle is moving.

A further disadvantage of this system is that it requires constant monitoring of the level of waste water in the container to avoid overflow and spillage of waste water.

Yet another disadvantage of this system is that the container is freely accessible when in use and may be stolen.

The present invention has been made from a consideration of the foregoing disadvantages and has for its general object to provide apparatus for collecting and storing waste water which is an improvement on the above-described system.

This is achieved according to the present invention by providing apparatus including a tank with an inlet for connection to a source of waste water and an outlet for draining waste water that can be detachably mounted on a touring caravan, camper van and like vehicle.

Advantageously, support means is provided for detachably mounting the tank on the vehicle.

Preferably, the support means has an inlet adaptor connected to one or more sources of waste water for connection to the tank inlet.

In this way, the tank is automatically connected to the or each source of waste water when mounted on the vehicle.

Advantageously, the tank inlet has valve means associated therewith adapted to open and close automatically when the tank is connected to and disconnected from the inlet adaptor.

As a result, spillage of waste water when the tank is disconnected for emptying is prevented.

Preferably, the tank includes sensor means for monitoring the level of waste water in the tank and indicating when the tank is full. For example the sensor means may provide a visual and/or audible warning when the tank requires emptying.

Advantageously, the support means provides an enclosure for the tank adapted to restrict access to the tank when mounted on the vehicle. For example, the enclosure may have a panel mounted for pivotal between a closed position in which the panel may be locked to prevent access to the tank and an open position allowing the tank to be located in and removed from the enclosure.

Other benefits, features and advantages of the invention will be apparent from the following description with reference to the accompanying drawing wherein the single Figure is an exploded isometric view of apparatus embodying the invention.

The apparatus shown in the drawing comprises a tank 1 for collecting and storing waste water detachably mounted in a carrier 2.

The tank 1 is preferably made of rigid plastics material to reduce weight and facilitate handling as described later, and the carrier 2 is preferably made of sheet metal but it will be understood that other materials may be used for the tank 1 and/or carrier 2.

The carrier 2 provides a rectangular enclosure 3 for the tank 1 and has opposed end walls 4,5 and a rear wall 6 upstanding from a rectangular base wall 7 with attachment means (not shown) at the upper edge of the end walls 4,5 and rear wall 6 for securing the carrier 2 to the underside of a touring caravan, camper van or like vehicle.

A front wall 8 of the carrier 2 is hinged for pivotal movement about a horizontal axis at the front edge of the base wall 7 between a vertical closed position (not shown) and a horizontal open position.

The front wall 8 is held in the horizontal open position by a pair of chains 9,10 or similar restraints extending between the upper front edge of each end wall 4,5 and the inner face of the front wall 8.

The tank 1 can be located in and removed from the enclosure 3 with the front wall 8 in the horizontal open position, and the front wall 8 is secured in the vertical closed position by releasable fastening means (not shown).

In this way, access to the tank 1 is prevented when the front wall 8 is secured in the vertical closed position and the fastening means may be lockable to prevent unauthorised removal of the tank 1.

A straight tubular inlet adaptor 11 is located in an aperture in the rear wall 6 of the carrier 2 adjacent one end of the enclosure 3 and has a rubber bush 12 inserted in the outer end.

A plurality of tubes 13 for connection respectively to sources of waste water such as a sink, washbasin, shower and toilet (not shown) extend through holes (not shown) moulded in the bush 12 with a further hole providing an air release.

The tank 1 has an inlet provided by a rearwardly facing female inlet coupling member 14 in a corner recess at one end and an outlet provided by a forwardly facing male coupling member 15 in a diagonally opposite corner recess at the other end.

The female coupling member 14 is aligned with and arranged to receive a male coupling member 16 at the inner end of the inlet adaptor 11 when the tank 1 is fitted by sliding horizontally into the enclosure 3 between the end walls 4,5 with an O-ring 17 on the male coupling member 16 providing a fluid-tight seal between the coupling members 14,16.

The tank 2 has inlet valve means (not shown) arranged to be opened automatically when the male coupling member 16 is received in the female coupling member 14 to allow waste water from the pipes 13 to flow into the tank 2.

The valve means is automatically closed when the male coupling member 16 is withdrawn from the female coupling member 14 to prevent spillage of waste water on removing the tank 2 from the enclosure 3 for emptying.

The base wall 7 may have a raised lip (not shown) at the front edge to locate and retain the tank 1 within the enclosure 3. In this way, disconnection of the coupling members 14,16 is prevented and the tank 1 can be lifted over the lip and slid outwards when it is desired to remove the tank 1 from the enclosure 3 for emptying.

The male coupling member 15 is received in a female coupling member 18 at one end of a tubular elbow outlet adaptor 19 with an O-ring 20 on the male coupling member 15 providing a fluid-tight seal between the coupling members 15,18.

A cap 21 is fitted over the other end of the outlet adaptor 19 to close the outlet preventing spillage of waste water and is releasably secured by one or more retaining clips 22 arranged to engage an annular flange 23 on the outlet adaptor 19 with an O-ring 24 on the outlet adaptor 19 providing a fluid-tight seal between the cap 21 and the outlet adaptor 19. The clip(s) 22 may be resilient for push-fit over the flange 23 to engage with a snap-action and released by levering over the flange 23.

The outlet adaptor 19 is releasably secured to the male coupling member 15 by one or more retaining clips 25 on the female coupling member 18 arranged to engage an annular collar 26 on the male coupling member 15 that allows the outlet adaptor 19 to be rotated about the axis of the male coupling member 15.

In this way, the outlet adaptor 19 can be rotated through 90° from a position in which the free end of the outlet adaptor 19 extends vertically upwards when the tank 1 is fitted in the enclosure 3 to a position in which the free end of the outlet adaptor 19 extends horizontally outwards from the end of the tank 1 for emptying the tank 1 when removed from the enclosure.

The outlet adaptor 19 may additionally be rotatable through a further 90° to a position in which the free end extends vertically downwards for releasing the retaining clip(s) 25 from the collar 26 to allow the outlet adaptor 19 to be disconnected if required.

Alternatively, the retaining clip(s) 25 may be resilient for push-fit over the collar 26 with a snap action and released by levering over the collar 26.

A sensor (not shown) mounted in the tank 1 operates a switch 27 on the rear wall 6 of the carrier 2 to provide an indication of the level of waste water in the tank 1. The switch 27 may be of any suitable type, for example a reed switch actuated by a magnet, and may be arranged to provide a visual and/or audible warning when the tank 1 is full.

The tank 1 is provided with a pair of handles 28,29 on the front wall for assisting manoeuvring of the tank 1 into and out of the enclosure 3 and for carrying the tank 1 to and from a suitable dumping point where the tank 1 can be emptied.

When the tank 1 has been taken to the dumping point, the cap 21 is removed to open the outlet and the outlet adaptor 19 rotated through 90° so that the open end extends from the end of the tank 1. The tank 1 can then

be tipped on its end to open the inlet valve means by suction allowing air to enter and drain the waste water from the tank 1 through the outlet.

When empty, the outlet adaptor 19 can be rotated back through 90° so that the free end extends upwards and the cap 21 re-fitted to close the outlet. The tank 1 is then returned to the enclosure 3 to re-connect the coupling members 14,16, and the front wall 8 of the carrier 2 closed and secured.

A removable inspection lid 30 mounted in an opening in the top wall of the tank 1 with a suitable seal (not shown) to prevent leakage of waste water provides access to the interior of the tank 1 if required for any purpose.

In addition to the above-described operation, the invented apparatus can also be connected direct to a sewer if a vehicle to which the apparatus is fitted is sited where a sewer is available thereby avoiding the need to remove and empty the tank 1 manually.

For this operation of the apparatus, the outlet adaptor 19 is removed as above-described and a hose (not shown) coupled to the male coupling member 15 for connecting the outlet from the tank 1 direct to the sewer.

The front wall 8 of the carrier 2 may be provided with a hinged flap (not shown) for passage of the hose connected to the male coupling member 15 with the front wall 8 in the closed position. In this way, access to and unauthorised removal of the tank 1 from the carrier 2 is prevented when the apparatus is connected directly to the sewer.

The tank 1 may be arranged to slope from the inlet to the outlet thereby enhancing flow of waste water to the outlet and reducing the risk of blockage occurring within the tank 1 for both modes of operation with the outlet closed for filling the tank or the outlet open and connected directly to the sewer for continuously draining the tank.

For example, the base wall 7 of the carrier 2 may be inclined downwardly from the inlet end 5 to the outlet end 4 with the tank 1 having a corresponding shape for sliding into the enclosure 3 as described above.

As will be apparent from the foregoing description of an exemplary embodiment, the invented apparatus provides a system for collecting and storing waste water in a tank that is detachably mounted on the vehicle permitting removal of the tank for manual dumping. Alternatively, the tank can be connected directly to a sewer where this option is available.

Detachably mounting the tank on the vehicle enables the system to be used both when the vehicle is stationary and moving thereby overcoming the disadvantages of a portable container which can only be used when the vehicle is stationary.

It will be understood that the invention is not limited to the exemplary embodiment above-described and that various modifications can be made within the general concept as described herein. For example, the shape of the tank and/or carrier may be adapted to suit the requirements of different vehicles to which the apparatus is fitted. Any suitable coupling means may be provided for automatically connecting the tank to the sources of waste water when the tank is positioned in the carrier.

Finally, the scope of the invention is deemed to include any novel feature or combination of features described herein and the disclosure is to be construed accordingly.

Claims:

1. Apparatus for disposal of waste water from a touring caravan, camper van and like vehicles comprises a tank for detachable mounting on the vehicle to connect releasably a tank inlet to a source of waste water from the vehicle such that the tank can be demounted for draining waste water from a tank outlet.

2. Apparatus according to Claim 1 wherein the tank inlet is releasably connectable to an inlet adaptor arranged for connection to the source of waste water.

3. Apparatus according to Claim 2 wherein the inlet adaptor is arranged for connection to a plurality of sources of waste water.

4. Apparatus according to Claim 2 or Claim 3 wherein the inlet adaptor is arranged to provide an air release.

5. Apparatus according to any one of Claims 2 to 4 wherein the tank inlet has associated valve means adapted to open and close automatically when the tank is connected to and disconnected from the inlet adaptor.

6. Apparatus according to any one of Claims 2 to 5 wherein the tank inlet is arranged for push-fit connection to the inlet adaptor.

7. Apparatus according to any one of Claims 2 to 6 including means providing a fluid-tight seal between the inlet adaptor and the tank inlet.

8. Apparatus according to any one of the preceding Claims including means for mounting the tank on the vehicle.

9. Apparatus according to Claim 8 wherein the mounting means is adapted to restrict access to the tank.

10. Apparatus according to Claim 9 wherein the mounting means has a panel movable between a closed position restricting access to the tank and an open position allowing access to the tank.

11. Apparatus according to Claim 10 including fastening means for releasably securing the panel in the closed position.

12. Apparatus according to Claim 11 wherein the fastening means is lockable.

13. Apparatus according to any one of Claims 10 to 12 wherein the panel is adapted to allow access to the tank outlet when the panel is in the closed position.

14. Apparatus according to Claim 13 wherein the panel has a flap movable between a closed position preventing access to the tank outlet and

an open position allowing access to the tank outlet when the panel is in the closed position.

15. Apparatus according to any one of the preceding Claims including means for releasably closing the tank outlet.

16. Apparatus according to any one of the preceding Claims including an outlet adaptor for the tank outlet.

17. Apparatus according to Claim 16 including means providing a fluid-tight seal between the outlet adaptor and the tank outlet.

18. Apparatus according to Claim 16 or Claim 17 wherein the outlet adaptor comprises an elbow member rotatably connectable to the tank outlet.

19. Apparatus according to any one of the preceding Claims including sensor means for monitoring the level of waste water in the tank.

20. Apparatus according to Claim 19 wherein the sensor means is arranged to provide a visual and/or audible warning when the tank requires emptying.

21. Apparatus according to any one of the preceding Claims including means providing access to the interior of the tank.

22. Apparatus according to Claim 21 wherein the access means comprises a removable inspection lid for an access opening in the tank.

23. Apparatus according to any one of the preceding Claims wherein the tank is arranged to slope from the tank inlet to the tank outlet when mounted on the vehicle.

24. Apparatus according to any one of the preceding Claims wherein the tank includes means for carrying the tank when detached from the vehicle.

25. Apparatus according to any one of the preceding Claims wherein the tank is made of plastics material.

26. Apparatus for disposal of waste water from a touring caravan, camper van and like vehicles substantially as hereinbefore described with reference to the accompanying drawing.

27. A waste water disposal system for touring caravans, camper vans and like vehicles comprises a tank having an inlet and an outlet and means for detachably mounting the tank on a vehicle to connect releasably the inlet to a source of waste water from the vehicle whereby the tank can be demounted to drain waste water from the outlet.